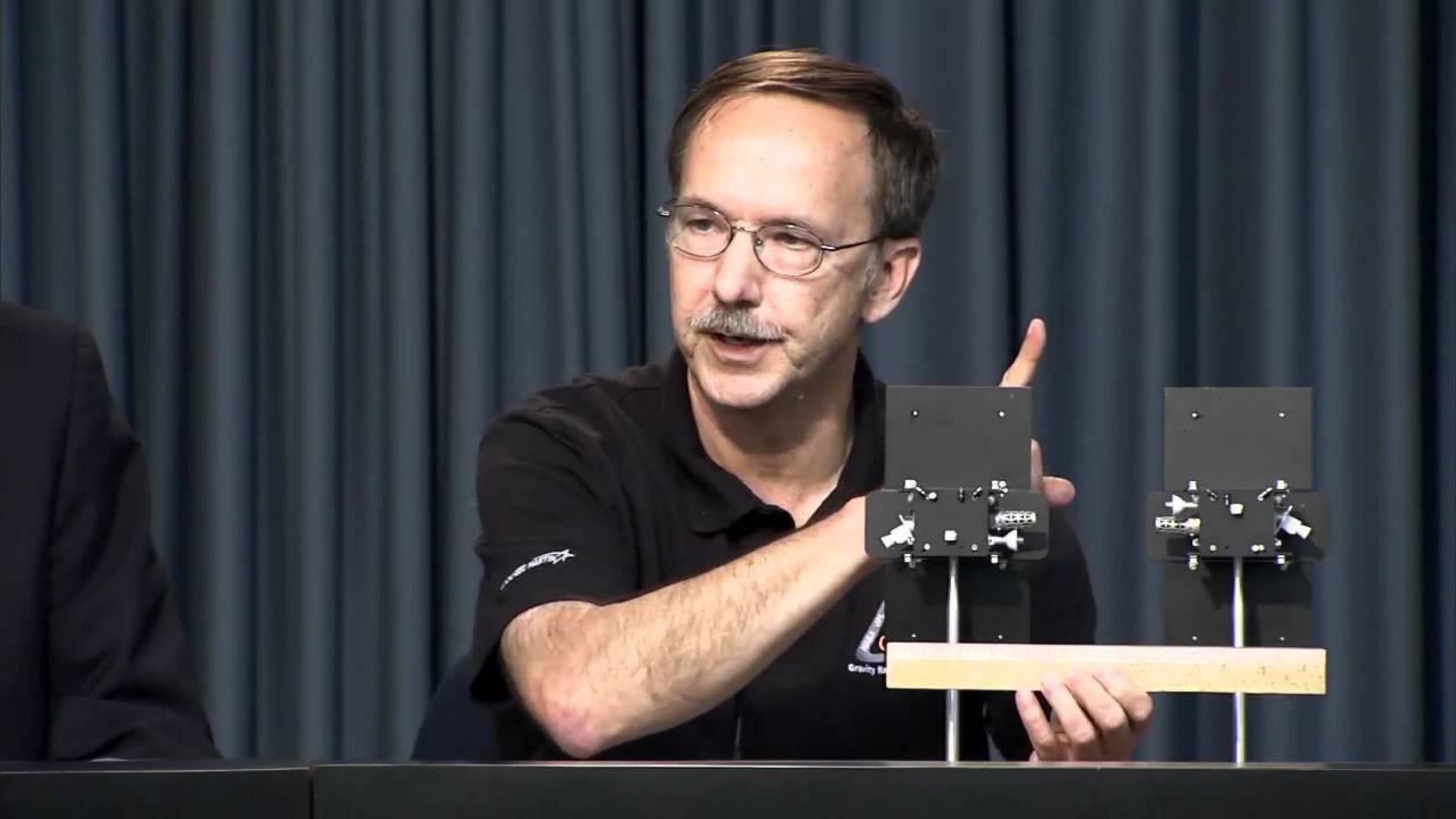

1
00:00:08,390 --> 00:00:05,749
good afternoon everyone this is the

2
00:00:09,270 --> 00:00:08,400
pre-launch news conference for the grail

3
00:00:12,150 --> 00:00:09,280
launch

4
00:00:14,709 --> 00:00:12,160
coming up on thursday aboard a united

5
00:00:16,950 --> 00:00:14,719
launch alliance delta ii rocket

6
00:00:18,790 --> 00:00:16,960
and here to talk about the mission and

7
00:00:21,590 --> 00:00:18,800
our upcoming launch

8
00:00:23,910 --> 00:00:21,600
is ed weiler the associate administrator

9
00:00:28,630 --> 00:00:23,920
for the science mission directorate at

10
00:00:34,069 --> 00:00:31,910
tim dunn the nasa launch director from

11
00:00:37,350 --> 00:00:34,079
nasa's kennedy space center here at cape

12
00:00:42,470 --> 00:00:40,549
vern thorpe the program manager for nasa

13
00:00:45,990 --> 00:00:42,480

missions from the united launch alliance

14
00:00:50,950 --> 00:00:48,549
david layman the grail project manager

15
00:00:54,470 --> 00:00:50,960
from the jet propulsion laboratory in

16
00:01:01,670 --> 00:00:57,110
john hank the grail program manager from

17
00:01:06,630 --> 00:01:04,070
and joel tumbiolo the launch weather

18
00:01:09,190 --> 00:01:06,640
officer from the 45th weather squadron

19
00:01:11,190 --> 00:01:09,200
at cape canaveral air force station

20
00:01:12,789 --> 00:01:11,200
and we'll begin first with comments from

21
00:01:14,390 --> 00:01:12,799
ed weiler ed

22
00:01:15,350 --> 00:01:14,400
thank you george good afternoon

23
00:01:18,070 --> 00:01:15,360
everybody

24
00:01:20,469 --> 00:01:18,080
this has truly been an incredible year

25
00:01:22,390 --> 00:01:20,479
for space science at nasa

26
00:01:24,550 --> 00:01:22,400
uh over the course of a year we've had

27
00:01:26,630 --> 00:01:24,560
two successful flybys of comets this

28
00:01:29,270 --> 00:01:26,640
fall and winter

29
00:01:31,190 --> 00:01:29,280
we went into orbit around

30
00:01:33,429 --> 00:01:31,200
mercury with messenger

31
00:01:35,990 --> 00:01:33,439
aquarius an earth observing

32
00:01:37,030 --> 00:01:36,000
satellite that will do both climate and

33
00:01:40,230 --> 00:01:37,040
weather

34
00:01:41,990 --> 00:01:40,240
was launched in june successfully

35
00:01:43,910 --> 00:01:42,000
dawn went into orbit around vesta in

36
00:01:45,910 --> 00:01:43,920
july juno

37
00:01:47,590 --> 00:01:45,920
was launched in august

38
00:01:48,950 --> 00:01:47,600

we're going to talk about grail today

39
00:01:50,789 --> 00:01:48,960
which hopefully will be launched on

40
00:01:53,350 --> 00:01:50,799
thursday weather permitting

41
00:01:54,950 --> 00:01:53,360
and then following up with the impulse

42
00:01:57,270 --> 00:01:54,960
preparatory mission which will be

43
00:02:00,310 --> 00:01:57,280
launched in october from vandenberg and

44
00:02:02,630 --> 00:02:00,320
uh the big one msl mars science lab we

45
00:02:04,550 --> 00:02:02,640
plan to launch just after thanksgiving

46
00:02:06,310 --> 00:02:04,560
and it'll be the largest rover ever sent

47
00:02:08,710 --> 00:02:06,320
to mars to determine whether mars was

48
00:02:10,710 --> 00:02:08,720
ever an abode for life

49
00:02:12,150 --> 00:02:10,720
getting back to grail first

50
00:02:16,309 --> 00:02:12,160
congrats to

51
00:02:19,190 --> 00:02:16,319
maria zuber her mit team contractors jpl

52
00:02:21,750 --> 00:02:19,200
for delivering grail to the launch pad

53
00:02:23,030 --> 00:02:21,760
on schedule and actually slightly below

54
00:02:24,630 --> 00:02:23,040
cost

55
00:02:26,070 --> 00:02:24,640
so just like juno it's the second

56
00:02:28,150 --> 00:02:26,080
mission in a row that's got here now on

57
00:02:29,830 --> 00:02:28,160
cost and schedule

58
00:02:31,509 --> 00:02:29,840
grail simply put as a journey to the

59
00:02:33,110 --> 00:02:31,519
center of the moon

60
00:02:35,270 --> 00:02:33,120
it will probe the interior of the moon

61
00:02:37,589 --> 00:02:35,280
and map its gravity field a hundred to a

62
00:02:40,070 --> 00:02:37,599
thousand times better than ever before

63
00:02:42,790 --> 00:02:40,080

we will learn more about the interior of

64
00:02:45,110 --> 00:02:42,800
the moon with grail than all previous

65
00:02:46,790 --> 00:02:45,120
lunar missions combined

66
00:02:48,070 --> 00:02:46,800
uh for those of you who are old enough

67
00:02:50,390 --> 00:02:48,080
to remember some of these things i'm

68
00:02:51,990 --> 00:02:50,400
going to talk about we crashed into the

69
00:02:53,190 --> 00:02:52,000
surface of the moon with a ranger

70
00:02:55,110 --> 00:02:53,200
several times

71
00:02:56,790 --> 00:02:55,120
we landed on moon on the moon several

72
00:02:58,149 --> 00:02:56,800
times with surveyor and scratched its

73
00:03:02,790 --> 00:02:58,159
surface

74
00:03:05,350 --> 00:03:02,800
and then of course apollo with apollo

75
00:03:07,589 --> 00:03:05,360
humans walked on the surface and drove

76
00:03:10,070 --> 00:03:07,599
dune buggies across the surface

77
00:03:11,750 --> 00:03:10,080
but grail is the first mission to look

78
00:03:13,350 --> 00:03:11,760
below that surface

79
00:03:15,670 --> 00:03:13,360
and how will it do that it's actually

80
00:03:18,390 --> 00:03:15,680
two small satellites that will fly in

81
00:03:20,390 --> 00:03:18,400
tandem about 200 kilometers apart about

82
00:03:22,229 --> 00:03:20,400
50 kilometers high

83
00:03:24,630 --> 00:03:22,239
the satellites will monitor each the

84
00:03:27,350 --> 00:03:24,640
distance between each other and as the

85
00:03:29,589 --> 00:03:27,360
first satellite goes over a higher mass

86
00:03:31,589 --> 00:03:29,599
concentration or higher gravity it will

87
00:03:32,630 --> 00:03:31,599
speed up slightly that'll increase the

88
00:03:34,229 --> 00:03:32,640

distance

89
00:03:36,149 --> 00:03:34,239
and then as the second satellite goes

90
00:03:37,430 --> 00:03:36,159
over that distance will close again

91
00:03:39,509 --> 00:03:37,440
that's how it actually maps the

92
00:03:41,270 --> 00:03:39,519
gravitational field of the moon and

93
00:03:43,190 --> 00:03:41,280
we'll do that over the course of three

94
00:03:47,509 --> 00:03:43,200
months and it'll do a complete map three

95
00:03:47,519 --> 00:03:50,149
let's see

96
00:03:54,149 --> 00:03:52,070
i won't go much more into the science of

97
00:03:56,070 --> 00:03:54,159
grail because i don't want to take

98
00:03:57,750 --> 00:03:56,080
professor zuber's

99
00:03:59,670 --> 00:03:57,760
wind out of her sales tomorrow she'll be

100
00:04:01,750 --> 00:03:59,680
talking to you at 10 o'clock in-depth

101
00:04:04,789 --> 00:04:01,760
science presentation

102
00:04:06,789 --> 00:04:04,799
i want to close by doing a commercial

103
00:04:10,949 --> 00:04:06,799
for an lro press conference that just

104
00:04:15,509 --> 00:04:13,509
lro is a lunar orbiter and it normally

105
00:04:16,949 --> 00:04:15,519
operates at about 31 miles over the

106
00:04:18,949 --> 00:04:16,959
course of the last

107
00:04:22,069 --> 00:04:18,959
past few months we dropped it to 13

108
00:04:24,550 --> 00:04:22,079
miles above the moon's surface

109
00:04:26,150 --> 00:04:24,560
that's about 70 000 feet for those of

110
00:04:29,590 --> 00:04:26,160
you who know airplanes that's about the

111
00:04:31,749 --> 00:04:29,600
height of a global hawk

112
00:04:32,870 --> 00:04:31,759
and i seen the pictures last week the

113
00:04:36,310 --> 00:04:32,880

stills

114
00:04:37,909 --> 00:04:36,320
they also mapped apollo 12 14 and 17's

115
00:04:40,790 --> 00:04:37,919
landing sites

116
00:04:42,629 --> 00:04:40,800
for those of you as old as i am you

117
00:04:45,030 --> 00:04:42,639
may remember how fun that was to watch

118
00:04:47,189 --> 00:04:45,040
those missions in real time on tv

119
00:04:48,950 --> 00:04:47,199
i urge you to go to nasa.gov to look at

120
00:04:51,110 --> 00:04:48,960
those images because they might bring

121
00:04:52,950 --> 00:04:51,120
some of that thrill of exploration from

122
00:04:55,110 --> 00:04:52,960
your youth back to you

123
00:04:57,510 --> 00:04:55,120
really really awesome images

124
00:05:00,469 --> 00:04:57,520
thank you thank you ed

125
00:05:02,870 --> 00:05:00,479
and now to tim dunn the launch director

126
00:05:04,629 --> 00:05:02,880
from nasa's launch services program here

127
00:05:06,230 --> 00:05:04,639
at kennedy tim

128
00:05:08,070 --> 00:05:06,240
thank you george

129
00:05:10,230 --> 00:05:08,080
i'm proud to be here today representing

130
00:05:12,150 --> 00:05:10,240
all the men and women of nasa's launch

131
00:05:14,230 --> 00:05:12,160
services program

132
00:05:15,510 --> 00:05:14,240
grail is my first mission as a nasa

133
00:05:17,510 --> 00:05:15,520
launch manager

134
00:05:19,749 --> 00:05:17,520
and i'm pleased to begin with a delta ii

135
00:05:23,189 --> 00:05:19,759
launch spacecraft heading back to the

136
00:05:25,189 --> 00:05:23,199
moon to do some extraordinary science

137
00:05:26,950 --> 00:05:25,199
grail is currently the last contracted

138
00:05:28,629 --> 00:05:26,960

delta ii mission to be launched from

139
00:05:30,189 --> 00:05:28,639
complex 17

140
00:05:34,469 --> 00:05:30,199
and it will be the

141
00:05:36,710 --> 00:05:34,479
356th overall delta to be launched

142
00:05:39,830 --> 00:05:36,720
complex 17 at the cape has a proud

143
00:05:42,870 --> 00:05:39,840
heritage of hosting 258

144
00:05:44,629 --> 00:05:42,880
of those 355 total delta launches to

145
00:05:47,430 --> 00:05:44,639
date

146
00:05:49,590 --> 00:05:47,440
over the past week for the grail mission

147
00:05:51,510 --> 00:05:49,600
the combined nasa and united launch

148
00:05:53,189 --> 00:05:51,520
alliance team has held the flight

149
00:05:55,189 --> 00:05:53,199
readiness review

150
00:05:57,830 --> 00:05:55,199
we assessed preparations of the rocket

151
00:05:59,590 --> 00:05:57,840
the spacecraft the range and facility

152
00:06:01,350 --> 00:05:59,600
infrastructure

153
00:06:04,309 --> 00:06:01,360
that it was ready to proceed with

154
00:06:05,909 --> 00:06:04,319
tanking of the second stage

155
00:06:07,670 --> 00:06:05,919
we then performed mission dress

156
00:06:09,909 --> 00:06:07,680
rehearsal last thursday

157
00:06:12,070 --> 00:06:09,919
with a successful conclusion

158
00:06:13,350 --> 00:06:12,080
and loaded hypergolic propellants on the

159
00:06:15,830 --> 00:06:13,360
second stage

160
00:06:18,150 --> 00:06:15,840
on friday

161
00:06:20,629 --> 00:06:18,160
our entire launch team was able to

162
00:06:23,189 --> 00:06:20,639
benefit from a

163
00:06:25,189 --> 00:06:23,199

busy week last week by taking the entire

164
00:06:27,909 --> 00:06:25,199
three-day weekend off which we really

165
00:06:30,469 --> 00:06:27,919
needed and much appreciated

166
00:06:32,469 --> 00:06:30,479
this morning we held a successful

167
00:06:34,469 --> 00:06:32,479
launch readiness review

168
00:06:36,150 --> 00:06:34,479
and we did receive concurrence from nasa

169
00:06:38,870 --> 00:06:36,160
management

170
00:06:42,150 --> 00:06:38,880
as well as spacecraft launch vehicle and

171
00:06:44,150 --> 00:06:42,160
range agencies to proceed into countdown

172
00:06:48,070 --> 00:06:44,160
i'd like to show a video of the build up

173
00:06:50,309 --> 00:06:48,080
of the grail delta ii heavy video uh

174
00:06:51,670 --> 00:06:50,319
processing at complex 17.

175
00:06:53,830 --> 00:06:51,680
can we roll that

176
00:06:57,350 --> 00:06:53,840
here you see the first stage booster

177
00:06:59,990 --> 00:06:57,360
coming out to complex 17b

178
00:07:01,430 --> 00:07:00,000
on the morning of 7 april of this year

179
00:07:04,390 --> 00:07:01,440
that's the power plant at the back of

180
00:07:07,270 --> 00:07:04,400
the first stage the rs27a

181
00:07:11,110 --> 00:07:07,280
nice decal as we get ready to erect into

182
00:07:15,029 --> 00:07:12,790
you're going to see a quick sequence of

183
00:07:18,309 --> 00:07:15,039
this erection activity

184
00:07:20,309 --> 00:07:18,319
as we use the mst here as a mobile crane

185
00:07:23,749 --> 00:07:20,319
and lift it in place onto the launch

186
00:07:27,029 --> 00:07:25,270
nice view of the cape canaveral

187
00:07:29,510 --> 00:07:27,039
lighthouse in the distance just north of

188
00:07:31,990 --> 00:07:29,520

complex 17.

189
00:07:33,350 --> 00:07:32,000
so here we are on the morning of april

190
00:07:35,749 --> 00:07:33,360
25th

191
00:07:39,589 --> 00:07:35,759
uh bringing out the solids for the

192
00:07:42,550 --> 00:07:39,599
mission a delta ii heavy has nine gym 46

193
00:07:44,950 --> 00:07:42,560
solids manufactured by atk

194
00:07:47,029 --> 00:07:44,960
so that erection sequence proceeds using

195
00:07:49,189 --> 00:07:47,039
the same mobile service tower as a

196
00:07:51,270 --> 00:07:49,199
mobile crane to bring those solids in

197
00:07:53,909 --> 00:07:51,280
close to the vehicle you see the ball

198
00:07:56,230 --> 00:07:53,919
and socket attach points there

199
00:07:58,150 --> 00:07:56,240
this is the morning of may 10th bringing

200
00:08:01,029 --> 00:07:58,160
out the second stage you see the second

201
00:08:03,350 --> 00:08:01,039
stage going up the side of the

202
00:08:06,070 --> 00:08:03,360
of complex 17. and here we fast

203
00:08:07,510 --> 00:08:06,080
forwarded to the morning of august 18th

204
00:08:10,550 --> 00:08:07,520
where we brought out the grail

205
00:08:12,710 --> 00:08:10,560
spacecraft in the transportation can

206
00:08:14,550 --> 00:08:12,720
this is the spacecraft transportation

207
00:08:17,029 --> 00:08:14,560
cam being lowered down onto the second

208
00:08:18,629 --> 00:08:17,039
stage just a quick shot of the fairings

209
00:08:25,670 --> 00:08:18,639
and there's a nice shot of both the

210
00:08:29,430 --> 00:08:27,350
the next sequence you're going to see is

211
00:08:31,670 --> 00:08:29,440
the payload fairings being brought in

212
00:08:34,149 --> 00:08:31,680
around the spacecraft and we did this in

213
00:08:35,990 --> 00:08:34,159

anticipation of hurricane irene we

214
00:08:37,269 --> 00:08:36,000
actually moved up this processing about

215
00:08:38,949 --> 00:08:37,279
a day and a half

216
00:08:40,389 --> 00:08:38,959
so that we could be all buttoned up and

217
00:08:41,589 --> 00:08:40,399
safe and secure in advance of the

218
00:08:43,190 --> 00:08:41,599
hurricane

219
00:08:45,190 --> 00:08:43,200
and you'll see there the

220
00:08:49,910 --> 00:08:45,200
payload fairing closeout our fairings

221
00:08:53,110 --> 00:08:49,920
manufactured in iuca mississippi by atk

222
00:08:56,630 --> 00:08:53,120
and we are now fully built up

223
00:08:58,310 --> 00:08:56,640
and buttoned up and ready to go

224
00:09:01,269 --> 00:08:58,320
just wanted to let you know that today

225
00:09:04,310 --> 00:09:01,279
at complex 17 we did our final range

226
00:09:05,430 --> 00:09:04,320
safety beacon checks we did our final

227
00:09:07,190 --> 00:09:05,440
pre-launch

228
00:09:08,550 --> 00:09:07,200
slewing of the engines and our final

229
00:09:12,230 --> 00:09:08,560
azimuth update

230
00:09:14,230 --> 00:09:12,240
all of those tests went well

231
00:09:16,790 --> 00:09:14,240
wednesday evening tomorrow evening we'll

232
00:09:19,190 --> 00:09:16,800
begin our final major pre-launch

233
00:09:21,030 --> 00:09:19,200
activities out at complex 17 where we

234
00:09:24,070 --> 00:09:21,040
will roll the mst into the launch

235
00:09:26,070 --> 00:09:24,080
position that will happen about 8 pm

236
00:09:27,590 --> 00:09:26,080
tomorrow evening

237
00:09:30,630 --> 00:09:27,600
the launch team is going to arrive on

238
00:09:31,990 --> 00:09:30,640

console about 4 a.m on thursday morning

239
00:09:33,670 --> 00:09:32,000
and we will then begin final

240
00:09:36,470 --> 00:09:33,680
preparations of the vehicle we'll turn

241
00:09:38,949 --> 00:09:36,480
power on about 5 30.

242
00:09:41,110 --> 00:09:38,959
about 6 a.m we'll begin pressurization

243
00:09:43,670 --> 00:09:41,120
sequence followed by loading of the

244
00:09:46,310 --> 00:09:43,680
first stage rp1 fuel

245
00:09:51,990 --> 00:09:46,320
and then at about 7 am we'll begin

246
00:09:56,070 --> 00:09:54,550
those will then proceed into final

247
00:09:58,150 --> 00:09:56,080
engine slewing

248
00:10:01,670 --> 00:09:58,160
and be ready to launch for our first

249
00:10:02,710 --> 00:10:01,680
opportunity on thursday of 8 37 and 06

250
00:10:04,949 --> 00:10:02,720
seconds

251
00:10:06,069 --> 00:10:04,959
eastern time

252
00:10:08,230 --> 00:10:06,079
and that

253
00:10:09,990 --> 00:10:08,240
completes the build up sequence and what

254
00:10:12,470 --> 00:10:10,000
we have remaining to do prior to launch

255
00:10:14,150 --> 00:10:12,480
on thursday back to you george thank you

256
00:10:15,990 --> 00:10:14,160
tim

257
00:10:18,069 --> 00:10:16,000
we'll hear now from vern thorpe the

258
00:10:19,990 --> 00:10:18,079
program manager for nasa missions from

259
00:10:21,910 --> 00:10:20,000
united launch alliance

260
00:10:24,069 --> 00:10:21,920
firm

261
00:10:26,630 --> 00:10:24,079
hey thank you george good afternoon

262
00:10:28,710 --> 00:10:26,640
i'm here on behalf of michael gass our

263
00:10:32,389 --> 00:10:28,720

president and chief executive officer at

264
00:10:33,990 --> 00:10:32,399
ula and the 3 700 men and women of ula

265
00:10:36,790 --> 00:10:34,000
we're very proud once again to be

266
00:10:39,350 --> 00:10:36,800
supporting nasa as we launch grail which

267
00:10:41,430 --> 00:10:39,360
is the third of five missions that ula

268
00:10:43,990 --> 00:10:41,440
is launching for nasa this year

269
00:10:46,630 --> 00:10:44,000
this launch also marks the ninth flight

270
00:10:49,829 --> 00:10:46,640
for ula in 2011

271
00:10:51,750 --> 00:10:49,839
the 49th delta ii mission for nasa and

272
00:10:52,710 --> 00:10:51,760
our third launch for nasa in just three

273
00:10:54,389 --> 00:10:52,720
months

274
00:10:56,069 --> 00:10:54,399
the ula team has worked very closely

275
00:10:57,990 --> 00:10:56,079
with our nasa partners for the last few

276
00:10:59,430 --> 00:10:58,000
years to get us to this point

277
00:11:01,030 --> 00:10:59,440
it's always wonderful to be part of one

278
00:11:02,790 --> 00:11:01,040
of these mission teams and to work side

279
00:11:04,949 --> 00:11:02,800
by side with such a capable and

280
00:11:06,630 --> 00:11:04,959
dedicated group of professionals

281
00:11:08,870 --> 00:11:06,640
uh we're ready to launch the grail

282
00:11:10,550 --> 00:11:08,880
spacecraft sending in sending it on its

283
00:11:12,389 --> 00:11:10,560
way to produce the gravity map that you

284
00:11:14,870 --> 00:11:12,399
heard about and allowing us to peer into

285
00:11:17,430 --> 00:11:14,880
the moon's interior a grail will be

286
00:11:19,990 --> 00:11:17,440
launched aboard a delta ii heavy

287
00:11:22,230 --> 00:11:20,000
it's a ula vehicle featuring a first

288
00:11:25,829 --> 00:11:22,240

stage booster powered by a pratt whitney

289
00:11:28,470 --> 00:11:25,839
rocketdyne rs 27a main engine

290
00:11:30,790 --> 00:11:28,480
we'll also have nine alliant tech system

291
00:11:33,750 --> 00:11:30,800
strap-on solid rocket motors on this

292
00:11:35,829 --> 00:11:33,760
mission as well an aerojet aj-10 engine

293
00:11:37,670 --> 00:11:35,839
will power the second stage

294
00:11:39,110 --> 00:11:37,680
and until we get out of the atmosphere

295
00:11:40,870 --> 00:11:39,120
the payload will be protected by a

296
00:11:42,630 --> 00:11:40,880
10-foot diameter composite payload

297
00:11:44,630 --> 00:11:42,640
fairing and

298
00:11:46,870 --> 00:11:44,640
you heard tim summarize the activities

299
00:11:48,630 --> 00:11:46,880
that take us down to t0 tomorrow morning

300
00:11:51,750 --> 00:11:48,640
i'd like to pick up the story starting

301
00:11:54,710 --> 00:11:51,760
at t-0 so if we could roll the video

302
00:11:59,190 --> 00:11:56,629
okay we'll lift off with a combined

303
00:12:03,030 --> 00:11:59,200
thrust of about 1.3 million pounds from

304
00:12:05,509 --> 00:12:03,040
six of the uh srbs and the uh the main

305
00:12:07,430 --> 00:12:05,519
engine on the the core stage first major

306
00:12:09,750 --> 00:12:07,440
event you'll see is when the six ground

307
00:12:12,550 --> 00:12:09,760
let srbs burn out we'll light the three

308
00:12:14,470 --> 00:12:12,560
airlit srbs jettison the six

309
00:12:15,350 --> 00:12:14,480
groundblade srb is about 80 seconds into

310
00:12:17,430 --> 00:12:15,360
flight

311
00:12:19,829 --> 00:12:17,440
the air lit srbs will burn for another

312
00:12:21,910 --> 00:12:19,839
80 seconds and 160 seconds into flight

313
00:12:23,509 --> 00:12:21,920

they'll burn out and be jettisoned that

314
00:12:25,190 --> 00:12:23,519
core stage will continue to burn until

315
00:12:27,350 --> 00:12:25,200
we run out of propellant that'll happen

316
00:12:29,190 --> 00:12:27,360
about four minutes and 23 seconds into

317
00:12:31,110 --> 00:12:29,200
flight at that time we'll jettison that

318
00:12:32,710 --> 00:12:31,120
first stage from the upper stage and

319
00:12:33,910 --> 00:12:32,720
we'll begin the first of several engine

320
00:12:35,829 --> 00:12:33,920
burns

321
00:12:37,829 --> 00:12:35,839
that first burn will last about two and

322
00:12:39,750 --> 00:12:37,839
a half minutes and shortly into it we'll

323
00:12:41,509 --> 00:12:39,760
jettison the payload fairing

324
00:12:43,430 --> 00:12:41,519
after that two and a half minute engine

325
00:12:46,389 --> 00:12:43,440
burn is complete we'll enter a parking

326
00:12:48,310 --> 00:12:46,399
orbit coast for about an hour

327
00:12:50,470 --> 00:12:48,320
at the end of that coast we'll be in the

328
00:12:52,150 --> 00:12:50,480
proper position for doing our second

329
00:12:53,509 --> 00:12:52,160
engine burn that'll be a four and a half

330
00:12:55,590 --> 00:12:53,519
minute burn

331
00:12:57,829 --> 00:12:55,600
and when that burn is complete

332
00:12:59,509 --> 00:12:57,839
we will have placed the spacecraft into

333
00:13:01,670 --> 00:12:59,519
the translunar trajectory that they need

334
00:13:04,870 --> 00:13:01,680
to be and over the next 20 minutes we'll

335
00:13:06,310 --> 00:13:04,880
reorient the upper stage we'll separate

336
00:13:08,310 --> 00:13:06,320
both of those spacecraft about 10

337
00:13:10,470 --> 00:13:08,320
minutes apart and then we'll perform a

338
00:13:12,710 --> 00:13:10,480

series of maneuvers with the upper stage

339
00:13:14,230 --> 00:13:12,720
to move it safely away from the

340
00:13:16,949 --> 00:13:14,240
spacecraft as they continue their

341
00:13:21,030 --> 00:13:18,790
we'll actually do it's not shown here

342
00:13:23,430 --> 00:13:21,040
but we'll actually do a third

343
00:13:24,790 --> 00:13:23,440
short engine burn with the upper stage

344
00:13:26,470 --> 00:13:24,800
and it'll place the

345
00:13:30,230 --> 00:13:26,480
upper stage safely out of the way in an

346
00:13:31,910 --> 00:13:30,240
orbit between the earth and mars

347
00:13:33,350 --> 00:13:31,920
we're proud to support nasa's science

348
00:13:34,629 --> 00:13:33,360
missions playing a critical role by

349
00:13:36,470 --> 00:13:34,639
delivering these one-of-a-kind

350
00:13:38,310 --> 00:13:36,480
spacecraft in support of the global

351
00:13:39,990 --> 00:13:38,320
science community this mission

352
00:13:42,470 --> 00:13:40,000
represents the culmination of years of

353
00:13:45,430 --> 00:13:42,480
hard work by nasa lockheed martin's

354
00:13:47,189 --> 00:13:45,440
spacecraft team and our ula launch team

355
00:13:49,189 --> 00:13:47,199
we anticipate that our delta ii vehicle

356
00:13:51,030 --> 00:13:49,199
will perform exceptionally well placing

357
00:13:52,310 --> 00:13:51,040
grail on an accurate translunar

358
00:13:53,910 --> 00:13:52,320
trajectory which will allow our

359
00:13:56,389 --> 00:13:53,920
scientists to study the structure of the

360
00:13:57,910 --> 00:13:56,399
lunar interior from crust to core

361
00:13:59,829 --> 00:13:57,920
and to advance our understanding of the

362
00:14:02,230 --> 00:13:59,839
thermal evolution of the moon

363
00:14:04,550 --> 00:14:02,240

as this is the last currently contracted

364
00:14:05,670 --> 00:14:04,560
launch from space complex

365
00:14:07,269 --> 00:14:05,680
17

366
00:14:09,189 --> 00:14:07,279
we'd like to reflect on the tremendous

367
00:14:11,269 --> 00:14:09,199
historical significance that this

368
00:14:13,590 --> 00:14:11,279
complex has had and on the impact of the

369
00:14:15,430 --> 00:14:13,600
military and the scientific missions

370
00:14:17,030 --> 00:14:15,440
that began their missions from complex

371
00:14:18,150 --> 00:14:17,040
17.

372
00:14:20,470 --> 00:14:18,160
those would include the global

373
00:14:21,829 --> 00:14:20,480
positioning satellites

374
00:14:23,110 --> 00:14:21,839
all the way up through

375
00:14:26,550 --> 00:14:23,120
gps

376
00:14:28,310 --> 00:14:26,560
21 the the last block to our mission

377
00:14:29,590 --> 00:14:28,320
that are we launch for the air force and

378
00:14:30,470 --> 00:14:29,600
they're used by people all around the

379
00:14:32,069 --> 00:14:30,480
world

380
00:14:33,430 --> 00:14:32,079
and there's a lot of other very famous

381
00:14:35,829 --> 00:14:33,440
science missions that launch from this

382
00:14:37,750 --> 00:14:35,839
complex as well most notably the spirit

383
00:14:40,949 --> 00:14:37,760
and opportunity rovers

384
00:14:42,069 --> 00:14:40,959
that flew on delta ii from that complex

385
00:14:44,710 --> 00:14:42,079
so

386
00:14:47,269 --> 00:14:44,720
overall this complex has seen 258 delta

387
00:14:49,590 --> 00:14:47,279
launches to date 109 of those have been

388
00:14:52,150 --> 00:14:49,600

delta ii uh grail will be the 110th

389
00:14:53,910 --> 00:14:52,160
delta ii launching from that complex

390
00:14:56,069 --> 00:14:53,920
and i'd like to once again thank all of

391
00:14:57,670 --> 00:14:56,079
our mission partners who've worked with

392
00:14:59,030 --> 00:14:57,680
us tirelessly to make this mission a

393
00:15:00,389 --> 00:14:59,040
success

394
00:15:01,829 --> 00:15:00,399
george i'll turn it back to you thank

395
00:15:04,790 --> 00:15:01,839
you vern

396
00:15:06,550 --> 00:15:04,800
next to the grail project manager david

397
00:15:09,829 --> 00:15:06,560
layman from the jet propulsion

398
00:15:11,350 --> 00:15:09,839
laboratory david thank you george

399
00:15:13,990 --> 00:15:11,360
good afternoon everybody

400
00:15:17,110 --> 00:15:14,000
grail was chosen as a discovery class

401
00:15:18,790 --> 00:15:17,120
mission in december 2007

402
00:15:20,949 --> 00:15:18,800
and a lot of things had to come together

403
00:15:23,430 --> 00:15:20,959
to make this mission happen

404
00:15:25,509 --> 00:15:23,440
our principal investigator professor

405
00:15:26,949 --> 00:15:25,519
maria zuber from mit she put together

406
00:15:28,949 --> 00:15:26,959
the science team

407
00:15:31,110 --> 00:15:28,959
and in addition to that at jpl is where

408
00:15:33,910 --> 00:15:31,120
we do the project management the

409
00:15:36,310 --> 00:15:33,920
instrument was built at jpl and also the

410
00:15:38,870 --> 00:15:36,320
mission operations lead is at jpl and

411
00:15:41,350 --> 00:15:38,880
then finally the spacecraft is built at

412
00:15:44,069 --> 00:15:41,360
lockheed martin in denver and they also

413
00:15:45,910 --> 00:15:44,079

perform the day-to-day operations of the

414
00:15:48,470 --> 00:15:45,920
spacecraft so i'd like to go to the

415
00:15:50,949 --> 00:15:48,480
first image please

416
00:15:52,310 --> 00:15:50,959
in this image we show what will happen

417
00:15:55,030 --> 00:15:52,320
after launch

418
00:15:57,110 --> 00:15:55,040
and here's the second stage

419
00:15:59,030 --> 00:15:57,120
uh with the fairing being deployed and

420
00:16:00,870 --> 00:15:59,040
we're getting ready to to deploy the two

421
00:16:03,590 --> 00:16:00,880
spacecraft grille a

422
00:16:05,269 --> 00:16:03,600
so this the second stage is maneuvered

423
00:16:08,470 --> 00:16:05,279
to the correct position

424
00:16:10,949 --> 00:16:08,480
and here we deploy a grail a spacecraft

425
00:16:13,430 --> 00:16:10,959
and this happens about 120 about an hour

426
00:16:15,110 --> 00:16:13,440
and a half after launch and then within

427
00:16:16,550 --> 00:16:15,120
a few seconds after that about five

428
00:16:17,590 --> 00:16:16,560
seconds is when the transmitter is

429
00:16:19,189 --> 00:16:17,600
turned on

430
00:16:21,189 --> 00:16:19,199
and then about five minutes later is

431
00:16:23,269 --> 00:16:21,199
when we expect to acquire the signal

432
00:16:25,189 --> 00:16:23,279
from the deep space network and then

433
00:16:27,509 --> 00:16:25,199
about eight minutes after the grill a is

434
00:16:28,870 --> 00:16:27,519
deployed then the grille b spacecraft

435
00:16:30,949 --> 00:16:28,880
are deployed

436
00:16:32,629 --> 00:16:30,959
and if we launch on september 8th it

437
00:16:34,230 --> 00:16:32,639
will take grail about three and a half

438
00:16:36,710 --> 00:16:34,240

months to make the voyage from the earth

439
00:16:37,829 --> 00:16:36,720
to the moon and here this next image i

440
00:16:40,389 --> 00:16:37,839
want to show you

441
00:16:42,230 --> 00:16:40,399
what this trajectory looks like on the

442
00:16:44,710 --> 00:16:42,240
left is shows the trajectory if we

443
00:16:46,470 --> 00:16:44,720
launch on september 8th and then we go

444
00:16:47,829 --> 00:16:46,480
all the way out to the l1 point this is

445
00:16:49,509 --> 00:16:47,839
where the gravity is balanced between

446
00:16:51,189 --> 00:16:49,519
the earth the moon and the sun

447
00:16:52,790 --> 00:16:51,199
and we do about five maneuvers in order

448
00:16:54,949 --> 00:16:52,800
to get the spacecraft

449
00:16:56,389 --> 00:16:54,959
into the correct orbit at mars but if we

450
00:16:59,269 --> 00:16:56,399
launch at the end of the launch period

451
00:17:01,509 --> 00:16:59,279
which is about 31 days later the middle

452
00:17:03,110 --> 00:17:01,519
curve shows the trajectory we go through

453
00:17:05,990 --> 00:17:03,120
to get to the moon

454
00:17:07,909 --> 00:17:06,000
but regardless of when we launch

455
00:17:09,590 --> 00:17:07,919
the two spacecraft arrive at the moon at

456
00:17:11,429 --> 00:17:09,600
the on the same day

457
00:17:13,029 --> 00:17:11,439
grail a will arrive on

458
00:17:15,270 --> 00:17:13,039
new year's eve this year and then grail

459
00:17:17,270 --> 00:17:15,280
b the next day on

460
00:17:19,350 --> 00:17:17,280
on new year's day

461
00:17:21,829 --> 00:17:19,360
and in the next image i want to show you

462
00:17:23,189 --> 00:17:21,839
what will be happening

463
00:17:25,510 --> 00:17:23,199

what will happen is

464
00:17:26,949 --> 00:17:25,520
the spacecraft will do about a 35-minute

465
00:17:27,990 --> 00:17:26,959
burn each one

466
00:17:30,070 --> 00:17:28,000
and then the next day the other

467
00:17:31,909 --> 00:17:30,080
spacecraft will do maneuver and these

468
00:17:34,070 --> 00:17:31,919
are approached from this from the south

469
00:17:36,470 --> 00:17:34,080
pole of the moon and then what we do is

470
00:17:38,549 --> 00:17:36,480
we do a series of intricate maneuvers

471
00:17:40,310 --> 00:17:38,559
with the two spacecraft over the next

472
00:17:42,070 --> 00:17:40,320
three months and our goal here is to

473
00:17:44,230 --> 00:17:42,080
centralize the orbit to circularize the

474
00:17:46,390 --> 00:17:44,240
orbit rather in order to put them in

475
00:17:47,510 --> 00:17:46,400
orbit around 55 kilometers above the

476
00:17:49,830 --> 00:17:47,520
moon

477
00:17:51,669 --> 00:17:49,840
and then once we're there

478
00:17:52,549 --> 00:17:51,679
the spacecraft they're on a one-way

479
00:17:54,230 --> 00:17:52,559
mission

480
00:17:56,470 --> 00:17:54,240
but what i want to talk about next is

481
00:17:58,070 --> 00:17:56,480
how do we get that data back and in the

482
00:18:00,230 --> 00:17:58,080
next animation

483
00:18:02,150 --> 00:18:00,240
you'll see the two spacecraft

484
00:18:04,230 --> 00:18:02,160
communicating with that with each other

485
00:18:06,630 --> 00:18:04,240
they're sending back k-band ranging

486
00:18:09,190 --> 00:18:06,640
signals also exchanging clocks between

487
00:18:11,029 --> 00:18:09,200
each other and then they're downlinking

488
00:18:13,909 --> 00:18:11,039

health and status data from the two

489
00:18:16,470 --> 00:18:13,919
spacecraft and then finally sitting down

490
00:18:18,310 --> 00:18:16,480
navigations to the data of navigation

491
00:18:20,950 --> 00:18:18,320
data for the scientists so that

492
00:18:22,390 --> 00:18:20,960
summarizes the grail mission and want to

493
00:18:24,470 --> 00:18:22,400
turn it back to you george all right

494
00:18:26,470 --> 00:18:24,480
thank you david we'll go now to the

495
00:18:30,070 --> 00:18:26,480
grail program manager from lockheed

496
00:18:32,870 --> 00:18:30,080
martin space systems john hink john

497
00:18:35,029 --> 00:18:32,880
thank you george good afternoon everyone

498
00:18:36,950 --> 00:18:35,039
uh let me start by just welcoming you to

499
00:18:38,710 --> 00:18:36,960
the grill team i want you to join the

500
00:18:40,230 --> 00:18:38,720
team a minute and just go over a little

501
00:18:41,830 --> 00:18:40,240
bit of the processing that we've seen

502
00:18:43,750 --> 00:18:41,840
here at

503
00:18:46,470 --> 00:18:43,760
the launch site since the spacecraft

504
00:18:50,630 --> 00:18:46,480
arrived at the end of may this year can

505
00:18:56,549 --> 00:18:53,430
we arrived here on the 20th of may on

506
00:18:58,230 --> 00:18:56,559
the c-17 both spacecraft were carried

507
00:18:59,990 --> 00:18:58,240
together in the spacecraft shipping

508
00:19:06,150 --> 00:19:00,000
container the one that actually was used

509
00:19:08,950 --> 00:19:07,990
shipping container was then moved over

510
00:19:10,870 --> 00:19:08,960
to the

511
00:19:13,510 --> 00:19:10,880
astrotech facility

512
00:19:15,350 --> 00:19:13,520
where we did the standalone spacecraft

513
00:19:17,190 --> 00:19:15,360

processing

514
00:19:20,150 --> 00:19:17,200
took it out of the container then went

515
00:19:21,669 --> 00:19:20,160
through a full series of

516
00:19:24,549 --> 00:19:21,679
arrival tests to make sure that

517
00:19:27,510 --> 00:19:24,559
everything was good

518
00:19:29,590 --> 00:19:27,520
and processed both vehicles

519
00:19:30,230 --> 00:19:29,600
in parallel similar to what we have done

520
00:19:32,150 --> 00:19:30,240
in

521
00:19:33,909 --> 00:19:32,160
throughout the

522
00:19:35,190 --> 00:19:33,919
spacecraft assembly and test period of

523
00:19:36,789 --> 00:19:35,200
time

524
00:19:39,590 --> 00:19:36,799
went through a number of operations

525
00:19:43,190 --> 00:19:39,600
including a final space or solar ray

526
00:19:46,630 --> 00:19:43,200
deploy activity on the turnover fixtures

527
00:19:46,640 --> 00:19:56,390
final software load and testing

528
00:20:00,310 --> 00:19:58,390
and then brought both vehicles from the

529
00:20:02,390 --> 00:20:00,320
normal processing facility building one

530
00:20:04,630 --> 00:20:02,400
there over to the hazardous processing

531
00:20:06,149 --> 00:20:04,640
facility for propellant loading

532
00:20:07,909 --> 00:20:06,159
pressurization

533
00:20:11,190 --> 00:20:07,919
and the start of integration with the

534
00:20:17,110 --> 00:20:12,950
we then assembled it into its launch

535
00:20:21,909 --> 00:20:19,190
and then unlike an atlas which would

536
00:20:23,830 --> 00:20:21,919
actually encapsulate in that facility

537
00:20:25,510 --> 00:20:23,840
the delta ii actually encapsulates at

538
00:20:27,590 --> 00:20:25,520

the launch pad so we go through a

539
00:20:29,430 --> 00:20:27,600
process called canning

540
00:20:31,990 --> 00:20:29,440
to actually get it into its transport

541
00:20:39,110 --> 00:20:32,000
configuration over to

542
00:20:43,590 --> 00:20:40,630
and from what you saw in the video

543
00:20:45,190 --> 00:20:43,600
before you saw a lot of the on-pad

544
00:20:47,909 --> 00:20:45,200
integration of the

545
00:20:50,070 --> 00:20:47,919
spacecraft onto the launch vehicle

546
00:20:52,630 --> 00:20:50,080
ending configuration as you can see here

547
00:20:55,029 --> 00:20:52,640
displayed the two vehicles sitting on

548
00:20:57,510 --> 00:20:55,039
their flat plate adapter

549
00:20:58,390 --> 00:20:57,520
married to the second stage of the delta

550
00:21:00,390 --> 00:20:58,400
ii

551
00:21:03,029 --> 00:21:00,400
the first part of encapsulation is

552
00:21:04,789 --> 00:21:03,039
actually started here with the back clam

553
00:21:06,470 --> 00:21:04,799
shell actually attached

554
00:21:09,590 --> 00:21:06,480
in that configuration so it gives you a

555
00:21:10,549 --> 00:21:09,600
good shot of what the vehicle

556
00:21:12,310 --> 00:21:10,559
and the

557
00:21:13,350 --> 00:21:12,320
the spacecraft look like integrated

558
00:21:16,870 --> 00:21:13,360
there

559
00:21:18,390 --> 00:21:16,880
what i'd like to be able to do is okay

560
00:21:20,470 --> 00:21:18,400
you've heard from the launch vehicle

561
00:21:22,549 --> 00:21:20,480
what happens in the next two days here

562
00:21:24,950 --> 00:21:22,559
as we get up to launch and then through

563
00:21:27,350 --> 00:21:24,960

launch for the spacecraft we actually

564
00:21:29,350 --> 00:21:27,360
start about 24 hours prior to launch

565
00:21:30,870 --> 00:21:29,360
with our final power up

566
00:21:32,870 --> 00:21:30,880
and again our configuration for the

567
00:21:35,190 --> 00:21:32,880
spacecraft is that you cannot turn it

568
00:21:37,669 --> 00:21:35,200
off once it's in its final configuration

569
00:21:40,789 --> 00:21:37,679
so there's not an on off switch we do

570
00:21:42,950 --> 00:21:40,799
that through enable plugs so 24 hours

571
00:21:44,710 --> 00:21:42,960
before they start closing out the launch

572
00:21:46,870 --> 00:21:44,720
complex and preparing for launch we'll

573
00:21:48,950 --> 00:21:46,880
actually go in power up

574
00:21:51,110 --> 00:21:48,960
do functional testing install the

575
00:21:53,510 --> 00:21:51,120
battery main enable plug and the pyro

576
00:21:56,070 --> 00:21:53,520
main enable plugs that put us into our

577
00:21:57,909 --> 00:21:56,080
flight configuration and from that point

578
00:22:00,470 --> 00:21:57,919
on we stay powered up for the rest of

579
00:22:05,110 --> 00:22:02,710
approximately four hours prior to launch

580
00:22:06,870 --> 00:22:05,120
we'll start into the terminal account as

581
00:22:08,149 --> 00:22:06,880
you can see at this point in time the

582
00:22:09,669 --> 00:22:08,159
main show is going to be the launch

583
00:22:11,590 --> 00:22:09,679
vehicle the spacecraft has already

584
00:22:13,430 --> 00:22:11,600
proven to be good to go

585
00:22:15,110 --> 00:22:13,440
and therefore we'll take the ride on the

586
00:22:17,750 --> 00:22:15,120
delta ii

587
00:22:19,270 --> 00:22:17,760
through separation

588
00:22:20,470 --> 00:22:19,280

a couple things would like to go over

589
00:22:22,549 --> 00:22:20,480
right now one of the most common

590
00:22:26,950 --> 00:22:22,559
questions often asked with

591
00:22:30,310 --> 00:22:28,950
and i'll use models as an indication

592
00:22:33,350 --> 00:22:30,320
here

593
00:22:37,430 --> 00:22:35,590
the makeup of the vehicles themselves

594
00:22:41,510 --> 00:22:37,440
tends to bring heritage from several

595
00:22:45,270 --> 00:22:43,350
the body of the spacecraft pretty much

596
00:22:46,470 --> 00:22:45,280
comes from an experimental satellite

597
00:22:48,470 --> 00:22:46,480
program

598
00:22:50,710 --> 00:22:48,480
with the propulsion the avionics

599
00:22:52,870 --> 00:22:50,720
internal to it comes to us from mars

600
00:22:54,789 --> 00:22:52,880
reconnaissance orbiter so a lot of the

601
00:22:57,029 --> 00:22:54,799
avionics itself

602
00:22:58,630 --> 00:22:57,039
would actually come from that pier that

603
00:23:00,710 --> 00:22:58,640
particular area

604
00:23:03,430 --> 00:23:00,720
the science it's

605
00:23:05,270 --> 00:23:03,440
for the ke band ranging system

606
00:23:07,590 --> 00:23:05,280
actually comes from the grace program

607
00:23:11,510 --> 00:23:07,600
which is a german

608
00:23:13,590 --> 00:23:11,520
paris satellites uh flying uh nasa

609
00:23:15,750 --> 00:23:13,600
science mission

610
00:23:17,350 --> 00:23:15,760
in terms of how this actually works it's

611
00:23:19,750 --> 00:23:17,360
fairly straightforward with respect to

612
00:23:21,750 --> 00:23:19,760
how do you gauge the distance between

613
00:23:24,149 --> 00:23:21,760

the two vehicles during the mission

614
00:23:25,990 --> 00:23:24,159
itself understand that the distances

615
00:23:28,149 --> 00:23:26,000
that we're actually trying to measure

616
00:23:31,029 --> 00:23:28,159
between these two spacecraft when they

617
00:23:31,909 --> 00:23:31,039
go into a formation the formation is is

618
00:23:34,390 --> 00:23:31,919
lead

619
00:23:37,669 --> 00:23:34,400
trailed by the second one actually about

620
00:23:40,149 --> 00:23:37,679
75 miles to 225 miles apart

621
00:23:42,470 --> 00:23:40,159
but we're trying to measure is the width

622
00:23:43,909 --> 00:23:42,480
of less than a human hair

623
00:23:45,590 --> 00:23:43,919
so you're trying to get very very

624
00:23:46,710 --> 00:23:45,600
precise measurements from the two

625
00:23:48,390 --> 00:23:46,720
vehicles

626
00:23:50,310 --> 00:23:48,400
the simple way to do it here is with the

627
00:23:51,830 --> 00:23:50,320
ka band system how do you measure

628
00:23:53,830 --> 00:23:51,840
distance

629
00:23:55,590 --> 00:23:53,840
you use a ruler

630
00:23:57,750 --> 00:23:55,600
so in other words our ruler is really

631
00:24:01,110 --> 00:23:57,760
the ka band signal between the

632
00:24:03,430 --> 00:24:01,120
spacecraft and understand that in the ka

633
00:24:06,630 --> 00:24:03,440
band range for an rf frequency you're

634
00:24:08,950 --> 00:24:06,640
talking billions of cycles per second so

635
00:24:10,950 --> 00:24:08,960
those are very precise

636
00:24:13,510 --> 00:24:10,960
and can be measured

637
00:24:15,830 --> 00:24:13,520
then so you have the k-band signal from

638
00:24:18,070 --> 00:24:15,840

the antennas you get the measurement

639
00:24:20,390 --> 00:24:18,080
from the antennas distance between the

640
00:24:22,950 --> 00:24:20,400
two of them you have a time transfer

641
00:24:25,590 --> 00:24:22,960
system that then hacks and can actually

642
00:24:28,390 --> 00:24:25,600
show you the timing associated with it

643
00:24:31,590 --> 00:24:28,400
so you get measurement of distance with

644
00:24:34,070 --> 00:24:31,600
the time and then you're able to range

645
00:24:35,510 --> 00:24:34,080
with the dsn station you get precise

646
00:24:37,510 --> 00:24:35,520
measurements there

647
00:24:40,070 --> 00:24:37,520
so it's a very straightforward very

648
00:24:41,590 --> 00:24:40,080
simple way of gaining the science quite

649
00:24:43,190 --> 00:24:41,600
a bit of math though associated with

650
00:24:45,269 --> 00:24:43,200
being able to take that and translate

651
00:24:47,190 --> 00:24:45,279
that into seeing the changes between

652
00:24:50,549 --> 00:24:47,200
them where they are on the moon and

653
00:24:52,870 --> 00:24:50,559
determining the gravity map from the two

654
00:24:54,710 --> 00:24:52,880
but anyway for those of us that have

655
00:24:56,630 --> 00:24:54,720
difficulty understanding this thing

656
00:24:59,350 --> 00:24:56,640
that's a little bit more straightforward

657
00:25:00,549 --> 00:24:59,360
with the uh with the two vehicles

658
00:25:02,710 --> 00:25:00,559
anyway

659
00:25:04,789 --> 00:25:02,720
back to you george thank you shawn

660
00:25:06,789 --> 00:25:04,799
we'll look out the weather for thursday

661
00:25:08,950 --> 00:25:06,799
morning joel tombiolo is our launch

662
00:25:10,710 --> 00:25:08,960
weather officer from the 45th weather

663
00:25:13,110 --> 00:25:10,720

squadron at cape canaveral air force

664
00:25:14,549 --> 00:25:13,120
station joel thank you george and good

665
00:25:17,029 --> 00:25:14,559
afternoon everyone

666
00:25:17,909 --> 00:25:17,039
as usually is the case during the late

667
00:25:19,990 --> 00:25:17,919
summer

668
00:25:21,909 --> 00:25:20,000
early fall like season weather is always

669
00:25:23,830 --> 00:25:21,919
an issue regardless what the mission is

670
00:25:25,430 --> 00:25:23,840
and this mission is no different if i

671
00:25:27,669 --> 00:25:25,440
could have the satellite picture up on

672
00:25:29,590 --> 00:25:27,679
one of the screens up there i could use

673
00:25:30,630 --> 00:25:29,600
that to aid in my

674
00:25:33,029 --> 00:25:30,640
discussion

675
00:25:35,430 --> 00:25:33,039
basically we have a feed of moisture

676
00:25:37,350 --> 00:25:35,440
that's stretching all the way from

677
00:25:39,269 --> 00:25:37,360
southwestern gulf of mexico all the way

678
00:25:41,669 --> 00:25:39,279
through the state of florida all the way

679
00:25:43,510 --> 00:25:41,679
to what was tropical storm lee

680
00:25:45,269 --> 00:25:43,520
which made landfall over louisiana a

681
00:25:47,350 --> 00:25:45,279
couple days ago or the center of

682
00:25:49,510 --> 00:25:47,360
circulation is right now over northern

683
00:25:51,350 --> 00:25:49,520
georgia but extending south and

684
00:25:53,669 --> 00:25:51,360
southwestward from that center of low

685
00:25:55,190 --> 00:25:53,679
pressure is a pressure low pressure

686
00:25:57,510 --> 00:25:55,200
trough or a front

687
00:25:59,830 --> 00:25:57,520
that is right now located over

688
00:26:02,470 --> 00:25:59,840

western florida into the eastern gulf of

689
00:26:04,549 --> 00:26:02,480
mexico and that front will be slowly

690
00:26:06,470 --> 00:26:04,559
moving eastward over the next couple of

691
00:26:08,149 --> 00:26:06,480
days and basically we'll be sitting

692
00:26:09,830 --> 00:26:08,159
right over central florida over the next

693
00:26:11,909 --> 00:26:09,840
couple of days so we're going to have

694
00:26:14,950 --> 00:26:11,919
that instability of a

695
00:26:16,390 --> 00:26:14,960
stationary front over the area and in

696
00:26:18,950 --> 00:26:16,400
addition to that we're going to have a

697
00:26:19,750 --> 00:26:18,960
large plume of tropical moisture feeding

698
00:26:21,990 --> 00:26:19,760
in

699
00:26:23,590 --> 00:26:22,000
from the southwest so basically what

700
00:26:25,029 --> 00:26:23,600
we're looking at is conditions like we

701
00:26:26,470 --> 00:26:25,039
had right now

702
00:26:28,789 --> 00:26:26,480
we're going to be looking at afternoon

703
00:26:30,310 --> 00:26:28,799
showers and thunderstorms mainly during

704
00:26:32,549 --> 00:26:30,320
the late afternoon and early evening

705
00:26:35,269 --> 00:26:32,559
hours that would be more of an issue for

706
00:26:37,590 --> 00:26:35,279
the tower roll as we are forecasting

707
00:26:39,269 --> 00:26:37,600
about a 60 chance of having

708
00:26:42,310 --> 00:26:39,279
lightning within five nautical miles in

709
00:26:44,710 --> 00:26:42,320
the area at the time tower roll is

710
00:26:46,230 --> 00:26:44,720
scheduled to almost begin

711
00:26:47,669 --> 00:26:46,240
assuming we get through that then the

712
00:26:49,669 --> 00:26:47,679
thunderstorms will die out after

713
00:26:51,510 --> 00:26:49,679

midnight and then once we get into the

714
00:26:52,390 --> 00:26:51,520
early morning hours into the terminal

715
00:26:53,590 --> 00:26:52,400
count

716
00:26:55,990 --> 00:26:53,600
the issues that we're going to be

717
00:26:57,830 --> 00:26:56,000
looking at is for thunderstorms

718
00:26:59,510 --> 00:26:57,840
developing not over the land of florida

719
00:27:00,710 --> 00:26:59,520
per se but over the eastern gulf of

720
00:27:03,029 --> 00:27:00,720
mexico

721
00:27:05,190 --> 00:27:03,039
and over the gulf stream to our east so

722
00:27:07,190 --> 00:27:05,200
we're going to be sandwiched in between

723
00:27:09,510 --> 00:27:07,200
probably two areas of thunderstorms and

724
00:27:11,190 --> 00:27:09,520
what we're going to be monitoring is

725
00:27:12,310 --> 00:27:11,200
thunderstorms that are to our west and

726
00:27:13,990 --> 00:27:12,320
the anvil clouds from those

727
00:27:16,630 --> 00:27:14,000
thunderstorms moving

728
00:27:17,990 --> 00:27:16,640
towards uh towards the east and we'll be

729
00:27:20,230 --> 00:27:18,000
looking at the android cloud world as

730
00:27:22,310 --> 00:27:20,240
far as that's concerned so that's pretty

731
00:27:24,470 --> 00:27:22,320
much basically the setup

732
00:27:26,549 --> 00:27:24,480
right now the forecast of for beginning

733
00:27:27,750 --> 00:27:26,559
of the launch window is a 60 chance of

734
00:27:29,830 --> 00:27:27,760
violation

735
00:27:31,830 --> 00:27:29,840
with the two main concerns being the

736
00:27:33,909 --> 00:27:31,840
anvil cloud rule again thunderstorms to

737
00:27:35,830 --> 00:27:33,919
our west during the early morning hours

738
00:27:37,350 --> 00:27:35,840

over the eastern gulf of mexico and the

739
00:27:39,510 --> 00:27:37,360
upper level winds are such that those

740
00:27:41,430 --> 00:27:39,520
anvils could be coming in our direction

741
00:27:43,110 --> 00:27:41,440
and also some local cumulus clouds and

742
00:27:44,710 --> 00:27:43,120
showers that could develop

743
00:27:46,870 --> 00:27:44,720
during the early morning hours although

744
00:27:49,029 --> 00:27:46,880
typically like i said we normally see

745
00:27:50,870 --> 00:27:49,039
our main area of thunderstorms in that

746
00:27:52,630 --> 00:27:50,880
during the afternoon and evening so

747
00:27:54,549 --> 00:27:52,640
we'll just be watching that there will

748
00:27:57,190 --> 00:27:54,559
be multiple multi-layer clouds in the

749
00:27:59,669 --> 00:27:57,200
area the winds will be out of the west

750
00:28:01,990 --> 00:27:59,679
around 10 peaking 18 knots

751
00:28:03,669 --> 00:28:02,000
below the threshold for liftoff and

752
00:28:05,669 --> 00:28:03,679
again there will be showers and

753
00:28:06,789 --> 00:28:05,679
thunderstorms in the vicinity mainly

754
00:28:08,789 --> 00:28:06,799
we're going to be looking at anvil

755
00:28:10,789 --> 00:28:08,799
clouds the temperature at the beginning

756
00:28:11,909 --> 00:28:10,799
of the window is going to be 82 to 83

757
00:28:14,149 --> 00:28:11,919
fahrenheit

758
00:28:15,110 --> 00:28:14,159
haven't reached fall yet some areas have

759
00:28:16,549 --> 00:28:15,120
not here

760
00:28:18,950 --> 00:28:16,559
and again like i said a six percent

761
00:28:21,350 --> 00:28:18,960
chance of a violation if we were to go

762
00:28:23,350 --> 00:28:21,360
into 24 hour delay pretty much the same

763
00:28:25,110 --> 00:28:23,360

scenario that front's still going to be

764
00:28:27,510 --> 00:28:25,120
over the area although inching its way

765
00:28:29,510 --> 00:28:27,520
southward and uh the next day looks

766
00:28:32,230 --> 00:28:29,520
pretty much identical forecast a six

767
00:28:33,269 --> 00:28:32,240
percent chance of no go for the same

768
00:28:35,110 --> 00:28:33,279
reasons

769
00:28:37,190 --> 00:28:35,120
if we were to go beyond that that front

770
00:28:39,350 --> 00:28:37,200
will slowly sink to the south and we'll

771
00:28:42,230 --> 00:28:39,360
have some drier air moving in that will

772
00:28:43,990 --> 00:28:42,240
affect the area once we get to uh

773
00:28:45,750 --> 00:28:44,000
weekend time frame friday saturday

774
00:28:46,789 --> 00:28:45,760
sunday time frame so those days look

775
00:28:47,590 --> 00:28:46,799
improved

776
00:28:49,190 --> 00:28:47,600
so

777
00:28:51,269 --> 00:28:49,200
we're looking forward to that

778
00:28:53,029 --> 00:28:51,279
tropics we are into the peak of our

779
00:28:53,909 --> 00:28:53,039
hurricane season it's been a very busy

780
00:28:56,070 --> 00:28:53,919
season

781
00:28:57,830 --> 00:28:56,080
and we have another least

782
00:28:59,830 --> 00:28:57,840
month and a half to two months of active

783
00:29:02,549 --> 00:28:59,840
weather we're currently following three

784
00:29:03,669 --> 00:29:02,559
systems uh neither of which

785
00:29:05,750 --> 00:29:03,679
are going to be affecting us in the

786
00:29:07,909 --> 00:29:05,760
short term hurricane katya that's well

787
00:29:09,830 --> 00:29:07,919
offshore no player here

788
00:29:12,710 --> 00:29:09,840

there is a system in the southwestern

789
00:29:14,549 --> 00:29:12,720
gulf of mexico basically at the tail end

790
00:29:16,470 --> 00:29:14,559
of the long long stream of moisture that

791
00:29:19,190 --> 00:29:16,480
i was referring to going all the way to

792
00:29:21,430 --> 00:29:19,200
the southwest at the very tail of that

793
00:29:23,190 --> 00:29:21,440
there's a system over the bay campeche

794
00:29:24,630 --> 00:29:23,200
that's starting to get organized so

795
00:29:26,789 --> 00:29:24,640
we're going to be watching that very

796
00:29:28,470 --> 00:29:26,799
closely over the next few days and then

797
00:29:30,470 --> 00:29:28,480
there's another system over the eastern

798
00:29:31,909 --> 00:29:30,480
atlantic typically coming off the coast

799
00:29:34,310 --> 00:29:31,919
of africa and moving all the way across

800
00:29:36,630 --> 00:29:34,320
the ocean and we will watch that over

801
00:29:38,389 --> 00:29:36,640
the next week week and a half it may

802
00:29:39,350 --> 00:29:38,399
affect antigua in the next two or three

803
00:29:41,430 --> 00:29:39,360
days

804
00:29:43,029 --> 00:29:41,440
but right now there's no immediate

805
00:29:44,789 --> 00:29:43,039
impact on the u.s

806
00:29:46,870 --> 00:29:44,799
so with that that's all i have george

807
00:29:49,430 --> 00:29:46,880
thank you all right thank you joel and

808
00:29:50,549 --> 00:29:49,440
we're ready now to take questions please

809
00:29:52,310 --> 00:29:50,559
keep in mind that there will be a

810
00:29:53,350 --> 00:29:52,320
science briefing in the morning

811
00:29:55,350 --> 00:29:53,360
and please give your name and

812
00:29:56,549 --> 00:29:55,360
affiliation when the microphone comes to

813
00:29:59,029 --> 00:29:56,559

you and we'll start here in the front

814
00:30:01,990 --> 00:29:59,039
with marcia um marcia dunn for tim dunn

815
00:30:05,110 --> 00:30:02,000
no relation i don't think um what time

816
00:30:07,110 --> 00:30:05,120
is your tower roll back and also

817
00:30:08,710 --> 00:30:07,120
how many days could you just keep trying

818
00:30:10,470 --> 00:30:08,720
consecutively before you would have to

819
00:30:11,990 --> 00:30:10,480
take a break for team rest or rocket

820
00:30:13,750 --> 00:30:12,000
issues

821
00:30:16,310 --> 00:30:13,760
our tower roll will begin tomorrow

822
00:30:19,269 --> 00:30:16,320
evening at 8 pm we start off with a crew

823
00:30:20,549 --> 00:30:19,279
briefing that's 8 p.m local time here

824
00:30:23,269 --> 00:30:20,559
eastern time

825
00:30:25,909 --> 00:30:23,279
and we then go into a walk-down of the

826
00:30:28,549 --> 00:30:25,919
tower so the physical movement of the

827
00:30:31,190 --> 00:30:28,559
tower generally would be in the 10 30 to

828
00:30:34,070 --> 00:30:31,200
midnight time frame

829
00:30:35,830 --> 00:30:34,080
as far as how many times could we go

830
00:30:37,590 --> 00:30:35,840
successive attempts

831
00:30:38,710 --> 00:30:37,600
currently we have two opportunities per

832
00:30:46,389 --> 00:30:38,720
day

833
00:30:47,830 --> 00:30:46,399
seconds is an opportunity about 39

834
00:30:49,269 --> 00:30:47,840
minutes later we have a second

835
00:30:51,990 --> 00:30:49,279
opportunity to go

836
00:30:54,789 --> 00:30:52,000
and we continue that cycle moving four

837
00:30:58,870 --> 00:30:54,799
minutes earlier each day

838
00:31:01,350 --> 00:30:58,880

as we proceed forward and we could

839
00:31:03,350 --> 00:31:01,360
given that it was not a launch vehicle

840
00:31:05,190 --> 00:31:03,360
issue or spacecraft hardware issue that

841
00:31:07,430 --> 00:31:05,200
we're trying to deal with as the cause

842
00:31:09,110 --> 00:31:07,440
for a scrub we could generally go about

843
00:31:11,750 --> 00:31:09,120
three days in a row before we would need

844
00:31:13,830 --> 00:31:11,760
to take crew rest

845
00:31:16,389 --> 00:31:13,840
and for dr weiler

846
00:31:17,909 --> 00:31:16,399
juno had a huge amount of interest and

847
00:31:20,710 --> 00:31:17,919
it came so close at the end of the

848
00:31:22,549 --> 00:31:20,720
shuttle program i'm wondering you know

849
00:31:24,710 --> 00:31:22,559
how you see all these space science

850
00:31:26,630 --> 00:31:24,720
missions taking on new interests perhaps

851
00:31:29,190 --> 00:31:26,640
among the public given that the shuttle

852
00:31:31,029 --> 00:31:29,200
is no longer launching from here and i

853
00:31:33,509 --> 00:31:31,039
if you could also add

854
00:31:36,230 --> 00:31:33,519
could grail provide any

855
00:31:38,950 --> 00:31:36,240
real insight for future landings places

856
00:31:41,190 --> 00:31:38,960
be them people or robots

857
00:31:43,110 --> 00:31:41,200
uh well i can't speak for ksc i don't

858
00:31:45,110 --> 00:31:43,120
live here at least not yet but someday i

859
00:31:46,630 --> 00:31:45,120
might anyway uh

860
00:31:48,710 --> 00:31:46,640
let's see uh

861
00:31:50,789 --> 00:31:48,720
we had i just heard just before this

862
00:31:52,950 --> 00:31:50,799
press conference started uh jim adams my

863
00:31:55,110 --> 00:31:52,960

deputy director for uh planetary was

864
00:31:57,750 --> 00:31:55,120
very proudly pointing out that we we had

865
00:31:58,870 --> 00:31:57,760
a goal of attracting 10 000

866
00:32:01,669 --> 00:31:58,880
visitors

867
00:32:04,070 --> 00:32:01,679
uh to see the juno launch and apparently

868
00:32:06,389 --> 00:32:04,080
the numbers now came in from bus data

869
00:32:09,269 --> 00:32:06,399
and that kind of stuff and we're very

870
00:32:11,029 --> 00:32:09,279
happy to hear that it was 12 300.

871
00:32:12,789 --> 00:32:11,039
so that was quite a victory i can't

872
00:32:14,630 --> 00:32:12,799
predict what it'll be for grail but we

873
00:32:16,950 --> 00:32:14,640
have we have a goal of getting you know

874
00:32:18,950 --> 00:32:16,960
at least 10 000 people down here

875
00:32:21,110 --> 00:32:18,960
uh we'll see what happens for grail of

876
00:32:22,149 --> 00:32:21,120
course we have msl coming up and i have

877
00:32:24,710 --> 00:32:22,159
a feeling

878
00:32:26,310 --> 00:32:24,720
mars seems to attract people's interest

879
00:32:27,750 --> 00:32:26,320
and continues to i have a feeling we're

880
00:32:29,110 --> 00:32:27,760
going to have a really good turnout for

881
00:32:30,870 --> 00:32:29,120
the mars mission

882
00:32:33,669 --> 00:32:30,880
but the administrator has set a goal to

883
00:32:35,269 --> 00:32:33,679
try to remind people that nasa is still

884
00:32:37,029 --> 00:32:35,279
doing business even though the shuttles

885
00:32:38,070 --> 00:32:37,039
you know stop flying now

886
00:32:39,909 --> 00:32:38,080
and

887
00:32:42,789 --> 00:32:39,919
i don't think we'll ever have a year in

888
00:32:44,710 --> 00:32:42,799

near near term uh like this one i mean i

889
00:32:46,870 --> 00:32:44,720
read the list of incredible this is this

890
00:32:48,310 --> 00:32:46,880
is the year of the solar system uh if

891
00:32:50,310 --> 00:32:48,320
you especially if you count the earth as

892
00:32:52,549 --> 00:32:50,320
a planet because last time i checked

893
00:32:53,750 --> 00:32:52,559
it's still defined as a planet uh

894
00:32:55,430 --> 00:32:53,760
counting those two earth science

895
00:32:56,789 --> 00:32:55,440
missions i didn't even count them but

896
00:32:59,110 --> 00:32:56,799
there must be eight or nine or ten

897
00:33:01,509 --> 00:32:59,120
launches or activities

898
00:33:04,230 --> 00:33:01,519
so uh we're uh we're doing pretty well

899
00:33:05,990 --> 00:33:04,240
this year and hopefully uh

900
00:33:08,310 --> 00:33:06,000
given a stable budget if we can have

901
00:33:10,470 --> 00:33:08,320
that uh we'll continue to in the future

902
00:33:12,549 --> 00:33:10,480
terms of grail uh

903
00:33:15,190 --> 00:33:12,559
uh in terms of how it might play into

904
00:33:16,149 --> 00:33:15,200
the human side uh or even future lunar

905
00:33:18,549 --> 00:33:16,159
missions

906
00:33:20,630 --> 00:33:18,559
uh it's important to point out that uh

907
00:33:22,549 --> 00:33:20,640
we don't really have a good feel for

908
00:33:24,230 --> 00:33:22,559
lunar gravity i mean the fact that this

909
00:33:25,350 --> 00:33:24,240
mission which is just a discovery

910
00:33:26,870 --> 00:33:25,360
mission is going to improve our

911
00:33:28,789 --> 00:33:26,880
understanding of the gravity field of

912
00:33:31,029 --> 00:33:28,799
the moon by factors of a hundred to a

913
00:33:32,870 --> 00:33:31,039

thousand is incredible

914
00:33:35,350 --> 00:33:32,880
uh that can be very critical critical

915
00:33:37,430 --> 00:33:35,360
for future landing of robotic spacecraft

916
00:33:39,269 --> 00:33:37,440
or even human spacecraft precisely

917
00:33:40,549 --> 00:33:39,279
knowing what the gravity fields are

918
00:33:42,149 --> 00:33:40,559
you're going to have to deal with

919
00:33:45,430 --> 00:33:42,159
because the moon is not a nice solid

920
00:33:47,269 --> 00:33:45,440
sphere solid rock it's got lunar mascons

921
00:33:49,669 --> 00:33:47,279
and you know orbits change it's it's

922
00:33:51,509 --> 00:33:49,679
actually quite a dicey thing to fly

923
00:33:53,590 --> 00:33:51,519
orbits around the moon because

924
00:33:55,590 --> 00:33:53,600
the moon is not very uniform and this

925
00:33:57,350 --> 00:33:55,600
mission's goal is to really really pin

926
00:33:59,029 --> 00:33:57,360
that down what is the gravity feel of

927
00:34:00,549 --> 00:33:59,039
the moon and we won't do it once we'll

928
00:34:03,350 --> 00:34:00,559
do it three times

929
00:34:05,590 --> 00:34:03,360
so we'll have some redundancy there

930
00:34:07,509 --> 00:34:05,600
and this kind of if you got the flavor

931
00:34:09,829 --> 00:34:07,519
of this mission i like to call it a real

932
00:34:10,790 --> 00:34:09,839
physics mission this is physics at its

933
00:34:12,069 --> 00:34:10,800
best

934
00:34:13,510 --> 00:34:12,079
uh

935
00:34:14,869 --> 00:34:13,520
you you have to get a feel for the

936
00:34:16,629 --> 00:34:14,879
incredible amount of data that's going

937
00:34:17,990 --> 00:34:16,639
to come out of this and if it weren't

938
00:34:20,470 --> 00:34:18,000

for computers i don't know how to ever

939
00:34:21,829 --> 00:34:20,480
do a mission like this because if you

940
00:34:23,589 --> 00:34:21,839
had to use a slide roll like someone was

941
00:34:26,550 --> 00:34:23,599
used to it would be a long long time

942
00:34:29,909 --> 00:34:28,310
justin justin ray with

943
00:34:31,349 --> 00:34:29,919
spaceflightnow.com

944
00:34:32,790 --> 00:34:31,359
a mission operations question i was

945
00:34:34,950 --> 00:34:32,800
wondering how challenging it is to be

946
00:34:36,710 --> 00:34:34,960
flying two spacecraft at the same time

947
00:34:38,869 --> 00:34:36,720
do you have two different teams flying

948
00:34:41,030 --> 00:34:38,879
grail a grill b or how does that all

949
00:34:42,069 --> 00:34:41,040
work

950
00:34:43,510 --> 00:34:42,079
okay

951
00:34:45,669 --> 00:34:43,520
it is a big challenge for us but we've

952
00:34:48,389 --> 00:34:45,679
been working on the plans for this three

953
00:34:50,069 --> 00:34:48,399
or four years now and actually we do

954
00:34:52,149 --> 00:34:50,079
have two teams there's a grail a team

955
00:34:54,790 --> 00:34:52,159
and a grail b team each flying the two

956
00:34:56,550 --> 00:34:54,800
spacecraft and so the the challenge for

957
00:34:59,109 --> 00:34:56,560
us is when we go into the

958
00:35:01,589 --> 00:34:59,119
into the end of the uh

959
00:35:02,950 --> 00:35:01,599
just prior to the science phase we call

960
00:35:04,790 --> 00:35:02,960
it the the

961
00:35:07,430 --> 00:35:04,800
transfer to science formation phase and

962
00:35:09,990 --> 00:35:07,440
this is where we we have to uh get the

963
00:35:12,310 --> 00:35:10,000

spacecraft very precisely into the right

964
00:35:14,710 --> 00:35:12,320
orbit and our navigators are a quarter

965
00:35:16,390 --> 00:35:14,720
million miles away from from the moon

966
00:35:18,310 --> 00:35:16,400
but yet we're able to

967
00:35:21,430 --> 00:35:18,320
navigate them in very precisely for the

968
00:35:24,630 --> 00:35:22,790
just another quick question i was

969
00:35:26,150 --> 00:35:24,640
wondering how soon after launch do you

970
00:35:27,670 --> 00:35:26,160
expect to

971
00:35:29,030 --> 00:35:27,680
be able to confirm the spacecraft or

972
00:35:31,030 --> 00:35:29,040
healthy the solar rays are out

973
00:35:31,990 --> 00:35:31,040
everything is is fine from a spacecraft

974
00:35:34,230 --> 00:35:32,000
point of view

975
00:35:35,829 --> 00:35:34,240
okay what will happen uh about an hour

976
00:35:37,750 --> 00:35:35,839
and a half after launch that's when

977
00:35:40,069 --> 00:35:37,760
grail a deploys

978
00:35:42,150 --> 00:35:40,079
and within five seconds is when the

979
00:35:44,950 --> 00:35:42,160
transmitter is turned on and the solar

980
00:35:47,109 --> 00:35:44,960
rays are also deployed and then the the

981
00:35:48,470 --> 00:35:47,119
deep space network at goldstone

982
00:35:50,950 --> 00:35:48,480
california will be tracking the

983
00:35:52,950 --> 00:35:50,960
spacecraft and that usually acquires

984
00:35:54,870 --> 00:35:52,960
within about five minutes and then the

985
00:35:57,030 --> 00:35:54,880
data is transferred to the team and then

986
00:35:59,030 --> 00:35:57,040
that's when we do the the actual

987
00:36:01,190 --> 00:35:59,040
processing the data to see how see what

988
00:36:05,589 --> 00:36:01,200

the health and status is so it'll it'll

989
00:36:12,150 --> 00:36:07,910
all right over here uh ken kramer have

990
00:36:16,390 --> 00:36:14,390
hi ken kramer for uh space flight

991
00:36:18,630 --> 00:36:16,400
magazine for um

992
00:36:20,630 --> 00:36:18,640
ed and tim i think can you reflect a

993
00:36:22,069 --> 00:36:20,640
little bit on the historic significance

994
00:36:25,190 --> 00:36:22,079
of the delta

995
00:36:27,430 --> 00:36:25,200
um in for nasa missions yeah vern talked

996
00:36:28,870 --> 00:36:27,440
a little bit about it from the ula side

997
00:36:31,190 --> 00:36:28,880
but talk a little bit about it from the

998
00:36:33,270 --> 00:36:31,200
nasa missions and also could you tell us

999
00:36:36,150 --> 00:36:33,280
about um do you have any potential

1000
00:36:38,310 --> 00:36:36,160
customers for these five left and and

1001
00:36:40,069 --> 00:36:38,320
why are we

1002
00:36:41,589 --> 00:36:40,079
phasing out the delta ii it's been so

1003
00:36:43,750 --> 00:36:41,599
successful i understand you have other

1004
00:36:45,349 --> 00:36:43,760
rockets but delta ii has been so

1005
00:36:48,470 --> 00:36:45,359
successful thanks

1006
00:36:50,310 --> 00:36:48,480
let me take the easy part of that now

1007
00:36:51,990 --> 00:36:50,320
the easy part of it is the delta ii has

1008
00:36:54,230 --> 00:36:52,000
been a workhorse for space science and

1009
00:36:56,150 --> 00:36:54,240
earth science it's uh i couldn't even

1010
00:36:58,069 --> 00:36:56,160
name all the missions

1011
00:37:00,150 --> 00:36:58,079
some of them mentioned uh

1012
00:37:01,750 --> 00:37:00,160
spirit and opportunity i mean talk about

1013
00:37:03,910 --> 00:37:01,760

public interest in space science

1014
00:37:05,589 --> 00:37:03,920
missions i mean those are launched by

1015
00:37:07,030 --> 00:37:05,599
deltas

1016
00:37:09,270 --> 00:37:07,040
many many of our

1017
00:37:11,349 --> 00:37:09,280
explorers going all the way back to

1018
00:37:14,390 --> 00:37:11,359
international ultraviolet explorer which

1019
00:37:15,829 --> 00:37:14,400
some people may remember a precursor to

1020
00:37:17,829 --> 00:37:15,839
back in the days when astronomers were

1021
00:37:20,470 --> 00:37:17,839
happy with a mere 18-inch telescope in

1022
00:37:23,349 --> 00:37:20,480
space pre-hubble that was launched on a

1023
00:37:26,150 --> 00:37:23,359
delta uh it launched many many explorers

1024
00:37:28,230 --> 00:37:26,160
too many to uh to even count somebody

1025
00:37:29,750 --> 00:37:28,240
probably has a statistics but if you

1026
00:37:32,630 --> 00:37:29,760
count earth and space science it's got

1027
00:37:34,870 --> 00:37:32,640
to be in the 50s 60s 70s

1028
00:37:36,950 --> 00:37:34,880
of missions so we're going to miss it

1029
00:37:39,190 --> 00:37:36,960
we're going to miss it a lot

1030
00:37:41,670 --> 00:37:39,200
yeah i'll just add on to that obviously

1031
00:37:43,870 --> 00:37:41,680
i gave some numbers earlier on how good

1032
00:37:46,870 --> 00:37:43,880
delta has been to us as a nation

1033
00:37:47,990 --> 00:37:46,880
355 launches on various delta launch

1034
00:37:51,750 --> 00:37:48,000
vehicles

1035
00:37:54,310 --> 00:37:51,760
specific for nasa of those 355

1036
00:37:56,790 --> 00:37:54,320
nasa has been involved in 231 of those

1037
00:37:58,790 --> 00:37:56,800
missions either with the primary payload

1038
00:38:00,790 --> 00:37:58,800

or performing launch management and

1039
00:38:02,150 --> 00:38:00,800
launch countdown expertise

1040
00:38:05,349 --> 00:38:02,160
dating all the way back to the very

1041
00:38:08,150 --> 00:38:05,359
first delta mission in may of 1960.

1042
00:38:13,510 --> 00:38:08,160
so delta has been very good to us

1043
00:38:17,750 --> 00:38:15,349
so vern i think i'm going to give the

1044
00:38:18,710 --> 00:38:17,760
tough questions to

1045
00:38:20,950 --> 00:38:18,720
uh

1046
00:38:23,349 --> 00:38:20,960
well the the medium class market that

1047
00:38:25,670 --> 00:38:23,359
delta has served for so many decades has

1048
00:38:26,790 --> 00:38:25,680
uh has really shrunk over the last few

1049
00:38:27,829 --> 00:38:26,800
years

1050
00:38:29,510 --> 00:38:27,839
and it's

1051
00:38:32,630 --> 00:38:29,520
it's just hard to find a business case

1052
00:38:35,109 --> 00:38:32,640
that works that allows you to

1053
00:38:35,990 --> 00:38:35,119
be able to launch the one or the two per

1054
00:38:37,510 --> 00:38:36,000
year

1055
00:38:39,030 --> 00:38:37,520
that the market demands right now and be

1056
00:38:40,630 --> 00:38:39,040
able to do it

1057
00:38:42,230 --> 00:38:40,640
for a reasonable price

1058
00:38:44,630 --> 00:38:42,240
the reason that we're able to still do

1059
00:38:46,390 --> 00:38:44,640
it for the next few years is because

1060
00:38:47,910 --> 00:38:46,400
since ula was formed we've been able to

1061
00:38:50,390 --> 00:38:47,920
integrate

1062
00:38:52,950 --> 00:38:50,400
our launch teams our engineering teams

1063
00:38:55,270 --> 00:38:52,960

our factories everything else

1064
00:38:57,430 --> 00:38:55,280
so that we're sharing resources between

1065
00:38:59,589 --> 00:38:57,440
the delta iv program and the atlas

1066
00:39:02,390 --> 00:38:59,599
program with delta ii so we were able to

1067
00:39:05,510 --> 00:39:02,400
take advantage of that and still keep

1068
00:39:07,109 --> 00:39:05,520
keep that launch service affordable

1069
00:39:09,349 --> 00:39:07,119
you know there the big question right

1070
00:39:11,270 --> 00:39:09,359
now is will there be more delta ii's we

1071
00:39:12,470 --> 00:39:11,280
certainly hope from ula's perspective

1072
00:39:15,349 --> 00:39:12,480
that there will be we have enough

1073
00:39:17,750 --> 00:39:15,359
inventory left to build five more

1074
00:39:19,430 --> 00:39:17,760
we have all the the skills that we need

1075
00:39:21,030 --> 00:39:19,440
in-house to be able to perform those

1076
00:39:22,950 --> 00:39:21,040
missions for the the reasons that i just

1077
00:39:25,510 --> 00:39:22,960
explained we've got an integrated team

1078
00:39:27,750 --> 00:39:25,520
now between atlas and delta

1079
00:39:29,270 --> 00:39:27,760
and we are in discussions with uh with

1080
00:39:31,589 --> 00:39:29,280
several commercial and government

1081
00:39:33,270 --> 00:39:31,599
customers regarding the possibility of

1082
00:39:34,950 --> 00:39:33,280
future sales

1083
00:39:36,790 --> 00:39:34,960
and you know that nasa is is one of

1084
00:39:38,230 --> 00:39:36,800
those organizations we're talking to we

1085
00:39:39,990 --> 00:39:38,240
can't talk about it too much right now

1086
00:39:43,030 --> 00:39:40,000
because we are in the

1087
00:39:45,030 --> 00:39:43,040
the proposal evaluation phase um

1088
00:39:46,390 --> 00:39:45,040

on the nls2 contract for on-ramping

1089
00:39:48,550 --> 00:39:46,400
delta ii

1090
00:39:50,390 --> 00:39:48,560
but uh we hope that sometime in the near

1091
00:39:52,550 --> 00:39:50,400
future that results in a few more

1092
00:39:56,550 --> 00:39:52,560
missions and those would most likely be

1093
00:39:58,470 --> 00:39:56,560
missions out of vandenberg as well

1094
00:40:03,030 --> 00:39:58,480
all right any further questions right

1095
00:40:06,230 --> 00:40:04,150
don vladiak for the canadian

1096
00:40:07,030 --> 00:40:06,240
broadcasting corporation and for tim

1097
00:40:08,630 --> 00:40:07,040
dunn

1098
00:40:10,950 --> 00:40:08,640
following up on marsha's question how

1099
00:40:13,109 --> 00:40:10,960
late can you delay the roll back before

1100
00:40:14,390 --> 00:40:13,119
it impacts the launch window on thursday

1101
00:40:17,589 --> 00:40:14,400
morning

1102
00:40:19,670 --> 00:40:17,599
generally the tower roll we have about a

1103
00:40:21,510 --> 00:40:19,680
four hour window between eight and

1104
00:40:22,550 --> 00:40:21,520
midnight where we like to accomplish

1105
00:40:24,150 --> 00:40:22,560
that

1106
00:40:26,230 --> 00:40:24,160
i mentioned you know the 10 30 to

1107
00:40:28,630 --> 00:40:26,240
midnight right now being the primary

1108
00:40:31,190 --> 00:40:28,640
target if we have to we could probably

1109
00:40:33,190 --> 00:40:31,200
push that back on the order of an hour

1110
00:40:35,589 --> 00:40:33,200
to an hour and a half before we would

1111
00:40:38,150 --> 00:40:35,599
run out of time uh with the other

1112
00:40:41,829 --> 00:40:38,160
activities that would get us to t0 thank

1113
00:40:43,750 --> 00:40:41,839

you and a follow-up for vern thorpe

1114
00:40:46,069 --> 00:40:43,760
will be any rocket cams on the delta to

1115
00:40:48,309 --> 00:40:46,079
give us some views of the launch

1116
00:40:50,790 --> 00:40:48,319
we have i know we have a forward-facing

1117
00:40:52,950 --> 00:40:50,800
camera on the front end and again it's

1118
00:40:55,190 --> 00:40:52,960
always a matter of if we have a good

1119
00:40:57,190 --> 00:40:55,200
telemetry link to get that data back

1120
00:40:59,910 --> 00:40:57,200
these cameras are not they're not

1121
00:41:01,430 --> 00:40:59,920
mandatory we don't they don't have to

1122
00:41:03,750 --> 00:41:01,440
return the data for the launch to be

1123
00:41:05,349 --> 00:41:03,760
successful so whether we have a perfect

1124
00:41:06,950 --> 00:41:05,359
link or not we'll go ahead and fly but

1125
00:41:09,349 --> 00:41:06,960
we'll keep our fingers crossed and we

1126
00:41:10,870 --> 00:41:09,359
hope we can see something and uh tim

1127
00:41:12,550 --> 00:41:10,880
maybe you remember do we have an aft

1128
00:41:14,150 --> 00:41:12,560
facing camera on this one no just the

1129
00:41:15,510 --> 00:41:14,160
forward face okay so we've got the one

1130
00:41:18,550 --> 00:41:15,520
forward facing camera on the second

1131
00:41:18,560 --> 00:41:21,990
any additional questions

1132
00:41:26,069 --> 00:41:23,910
all right in that event a couple of

1133
00:41:28,069 --> 00:41:26,079
programming notes our next gradle event

1134
00:41:30,870 --> 00:41:28,079
is the grail mission science briefing

1135
00:41:32,309 --> 00:41:30,880
which is in the morning at 10 a.m

1136
00:41:34,630 --> 00:41:32,319
eastern time

1137
00:41:38,230 --> 00:41:34,640
our launch coverage on nasa tv will

1138
00:41:40,309 --> 00:41:38,240

start at 6 a.m on thursday morning

1139
00:41:42,150 --> 00:41:40,319
and right now we are planning to have a

1140
00:41:43,670 --> 00:41:42,160
post-launch news conference that we

1141
00:41:45,670 --> 00:41:43,680
approximately

1142
00:41:47,270 --> 00:41:45,680
launch plus two and one half hours is

1143
00:41:49,430 --> 00:41:47,280
what we're targeting depending on how

1144
00:41:50,230 --> 00:41:49,440
much information we have at that point

1145
00:41:52,069 --> 00:41:50,240
about

1146
00:41:54,870 --> 00:41:52,079
the state of health and what the

1147
00:41:57,510 --> 00:41:54,880
spacecraft has been doing